NOVAE GESNERIACEAE NEOTROPICARUM XV: *KOHLERIA HYPERTRICHOSA*, A NEW SPECIES OF GESNERIACEAE FROM NORTHWESTERN ECUADOR

John Littner Clark

Department of Biological Sciences
Box 870345
The University of Alabama
Tuscaloosa, Alabama 35487-0345. U.S.A.
jlc@ua.edu

Laurence E. Skog

Botany Department, MRC-166
Smithsonian Institution, PO Box 37012
National Museum of Natural History
Washington, DC 20013-7012. U.S.A.
skogl@si.edu

ABSTRACT

A new species of *Kohleria* (Gesneriaceae, tribe Gloxinieae) is described from the Andean cloud forests of the Carchi and Esmeraldas provinces in northwestern Ecuador where it is an abundant local endemic. The remarkable long wooly trichomes in combination with a fruit dehiscing by a single dorsal slit and epiphytic habit differentiate **Kohleria hypertrichosa** from other species of *Kohleria*.

RESUMEN

Se describe una nueva especie de *Kohleria* (Gesneriaceae, tribe Gloxinieae) de los bosques nublados andinos de las provincias de Carchi y Esmeraldas en el noroeste de Ecuador, en donde es una especie endémica abundante localmente. Los largos tricomas lanosos junto con la dehiscencia del fruto por medio de una hendidura dorsal y el hábito epifítico diferencian a **Kohleria hypertrichosa** de otras especies de *Kohleria*.

Key Words: *Kohleria, Capanea, Monopyle,* Ecuador, Gesneriaceae

The most recent treatment of the genus *Kohleria* Regel is that by Kvist and Skog (1992), who recognized 17 species. More recently, Roalson et al. (2005a) transferred the two species of the genus *Capanea* Decaisne ex Planchon to *Kohleria* making it currently a genus of 19 recognized species. The revised circumscription of *Kohleria* to include *Capanea* (Roalson et al. 2005a) is based primarily on molecular data from the nuclear ribosomal DNA internal transcribed spacer region, the chloroplast DNA *trnL* intron and *trnL-trnF* intergenic spacer region (Roalson et al. 2005b). Traditional *Kohleria* (e.g., the recent monograph by Kvist and Skog, 1992) would be paraphyletic with the exclusion of *Capanea*. Thus, many of the features that differentiated *Capanea* are autapomorphic for a well-supported clade nesting in *Kohleria* (Roalson et al. 2005b).

The new species described here has a history of being collected in the Carchi province where it is locally abundant in cloud forests. It was initially assumed to be a new species of *Capanea* by Hans Wiehler when it was collected and appeared in a photograph in the horticultural journal *The Gloxinian* (McDowell 1995). Images of *K. hypertrichosa* also appeared in the *Gesneriad Journal* as a new species of *Capanea* in a report of a collecting expedition to Ecuador (Dunn 1997). The species was assumed to be a member of this formerly recognized genus because of the woolly pubescence, the shape of the corolla, and its epiphytic habit. Vegetatively *Kohleria hypertrichosa* appears similar to *Monopyle* because of the strongly anisophyllous leaves and dorsiventral shoots. In the type locality of *Kohleria hypertrichosa*, the species *Monopyle macrocarpa* Benth. is also abundant (cf., field collection *J.L. Clark 6298*). The two species often grow side-by-side and telling them apart vegetatively is challenging.

The species described here is remarkable in that it has been collected and specimens annotated as belonging to *Monopyle* or *Capanea*, but not *Kohleria*. The correct placement of this new species has perplexed many Gesneriaceae workers because of its habit (facultative epiphyte instead of the more typical terrestrial habit in *Kohleria*); thick wooly pubescence on the outer surface of the corolla (more typical of *Capanea*); and strongly anisophyllous leaves (more typical of *Monopyle*). The key synapomorphy for recognizing traditional *Kohleria* is a fruit dehiscing by a single dorsal slit from apex to base (Figs. 1D and 2G). The presence of this type of fruit in this species was unknown until it was observed and photographed in 2001 (cf., field collection *J.L. Clark 6288*). Many other collectors (e.g., Tirado and Hoover) had documented this new species in

flower, but not in fruit, thus making it a difficult species to place without molecular data. The presence of a bilobed stigma is a notable feature that *K. hypertrichosa* shares with most congeners. A stomatomorphic stigma is present in *Monopyle* and is an autapomorphy in the two traditionally recognized species of *Capanea* that were recently combined in *Kohleria* (Roalson et al. 2005a).

Another morphological feature of many species in *Kohleria*, which is also present in *K. hypertrichosa*, is the presence of a ventricose apical pouch on the lower side of the corolla. The ventricose pouch in *K. hypertrichosa* is sometimes obscured after anthesis and on pressed herbarium collections (e.g., the pouch was not apparent in early photographs and collections such as *J.L. Clark & R.W. Dunn 2406* and *J.L. Clark et al. 2408*).

The generic placement of *K. hypertrichosa* is also strongly supported by molecular data from the nuclear ribosomal DNA internal transcribed spacer region, the chloroplast DNA *trnL* intron and *trnL-trnF* intergenic spacer region (Roalson et al. 2005b). One of the samples that appeared in the phylogeny published by Roalson et al. is a tissue sample from silica gel-dried leaves of a paratype of *K. hypertrichosa* (cf., field collection *J.L. Clark & R.W. Dunn 2446*). The specific collection is noted in Roalson et al. (2005b) as, "*Kohleria* sp. nov. 2446" where it was shown as being strongly supported as the sister taxon to *Kohleria villosa* (Fritsch) Wiehler.

Kohleria hypertrichosa J.L. Clark & L.E. Skog, sp. nov. (**Figs. 1–2**). TYPE: ECUADOR. CARCHI: Cantón Espejo, Parroquia Guatal, Mirador de las Golondrinas (Fundación Golondrinas), trail from Santa Rosa (El Rosal) to the refugio at El Corazon, 00°49'46"N, 78°07'03"W, 1600–2000 m, 5 Jul 2003, *J L. Clark, S.G. Clark, E. Folleco & B. Syka 8450* (HOLOTYPE: US; ISOTYPES: AAU, BRIT, C, CAS, COL, E, F, GH, K, MO, NY, QCA, QCNE, SEL, UNA, US, W).

A speciebus congeneribus omnino in tres characteribus combinatis: in habitis epiphyticis pro parte maxima et in corollis perlanatis et in fructis bivalvatis sed dorsaliter longitudinaliter unifissis, distincta.

Facultative epiphytic climber; rarely terrestrial, stems dorsiventral to erect, frequently branched, to 2 m long, subwoody to herbaceous, terete, glabrescent below, densely pilose to sericeous above. *Leaves* opposite, unequal in a pair; larger leaf with petioles terete, 3–10 mm long, green, densely sericeous, blade subcoriaceous when dry, elliptic to slightly falcate, 6–14 × 1.5–4 cm, base acute and occasionally asymmetrical, apex attenuate, margin serrate, adaxially pale green, sparingly to densely pilose (especially on veins), abaxially green to reddish-green, uniformly pilose; smaller leaf with petioles sessile to 3 mm long, green, densely sericeous, blade subcoriaceous when dry, broadly ovate (rarely narrowly ovate), 1–2.5 × 1–1.5 cm, base and apex rounded, margin serrate, adaxially pale green, sparingly to densely pilose (especially on veins), abaxially green to reddish-green, uniformly pilose. *Inflorescence* epedunculate, reduced cyme, appearing fasciculate, with 1 (rarely 2) flower per node at or near stem apices; bracteoles absent; pedicels longer than the petiole, 1.5–3 cm long, densely sericeous. *Flowers* zygomorphic, not resupinate; calyx lobes 5, ventral lobe free, lateral and dorsal lobes basally connate for 3–5 mm, lobes erect at anthesis, reflexed in fruit, equal, ovate, 1.5–2.0 × 0.5–1.0 cm, apex acute, margin nearly entire with 1–3 pairs of serrations, bright red, outside densely sericeous, inside sparsely sericeous; corolla horizontal in calyx; 2.5–3.0 cm long; base 1 cm in diameter, middle ampliate, becoming apically ventricose on lower surface, throat slightly constricted, appearing laterally compressed, to 1 cm wide (at mouth), outside yellowish-white, covered with dense villous white pubescence, inside mostly yellow with red spots, mouth with glandular trichomes, lobes glabrous, red, subequal, rotund, to 3 mm long, to 5 mm wide, rounded, entire; nectary of five separate glands evenly distributed around ovary, each 1.0–1.5 mm high and 0.5–1.5 mm wide at base, glabrous; stamens 4, didynamous, included; filaments 1.6 cm long, adnate to the base of the corolla tube, pilose; anthers longer than broad, ca. 2 mm long, ca. 1.5 mm wide, dehiscing by longitudinal slits; staminode not observed; ovary inferior, villous, 2–5 × 3–6 mm, style 9–12 mm long, sericeous, stigma included, forked. *Fruit* an oblong capsule, 20–30 mm long, diameter 4–8 mm, dehiscing by a single dorsal slit from apex to base; seeds numerous, subglobose, irregularly striate, 0.4 × 0.3 mm, dark brown.

Phenology.—Flowering in January, April, May, November, and December. The only collections with fruits are from May, July, and December.

Distribution.—*Kohleria hypertrichosa* is known from northwestern Ecuadorian cloud forests on the western Andean slopes of the Carchi and Esmeraldas provinces from 1100 to 2000 meters. It is locally

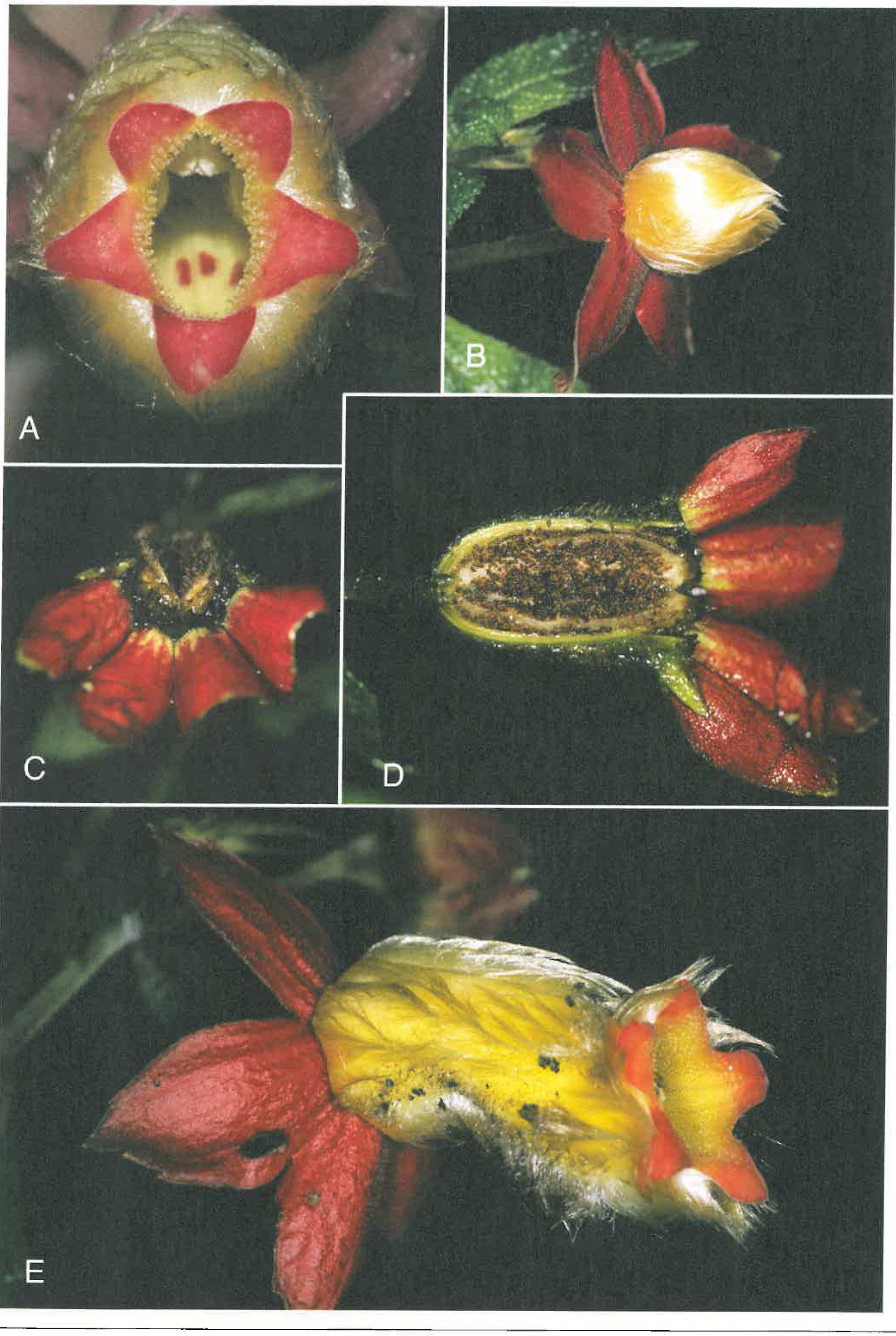

FIG. 1. *Kohleria hypertrichosa* J.L. Clark & L.E. Skog. **A.** Front view of corolla. **B.** Immature flower. **C.** Front view of capsule. **D.** Fruit dehiscing by a single dorsal slit. **E.** Lateral view of flower. (A from *J.L. Clark et al. 6359;* B & E from *J.L. Clark et al. 8462;* C & D from the holotype, *J.L. Clark et al. 8450*)

Fig. 2. ***Kohleria hypertrichosa*** **J.L. Clark & L.E. Skog A. Habit. B. Side view of flower. C. Face view of flower. D. Glandular trichomes on mouth of corolla. E. Corolla opened to show stamens. F. Calyx opened and corolla removed to show valvate nectary glands. G. Mature fruit. H. Seeds. (A–H from** ***J.L. Clark et al. 6359*****).**

abundant sometimes covering trees and trailsides, especially in the Mirador de las Golondrinas, a private reserve managed by Fundación Golondrinas and the Gualpi area near the Reserva Awá (collections exist both inside and outside the Territorio Awá). No collections of *Kohleria hypertrichosa* have been made outside of the Carchi and Esmeraldas provinces, but it is likely to also occur in the adjacent Department of Nariño, Colombia where limited recent botanical exploration has taken place.

Etymology.—The epithet *hypertrichosa* is derived from the congenital condition of generalized "Hypertrichosis," the medical term referring to a condition of excessive growth of body hair in humans. The condition is commonly known as "Werewolf syndrome" which comes from a mythological werewolf of which the person is completely covered in hair or fur. Although not commonly grown in cultivation, the plant species is known among horticulturalists as "Chewbacca," for the famous hairy biped character ("Wookie") from the popular cult phenomenon 1977 movie Star Wars IV: A New Hope.

Paratypes. **ECUADOR. Carchi:** Cantón Espejo, Bosque Protector Mirador de Golondrinas, between the village Las Juntas and la Cabaña del Corazón, 00°49'N, 78°01'W, 1360–2000 m, 8 Apr 1996, *J.L. Clark, P. Sabbe & R.W. Dunn 2408* (MO, QCNE, SRP, US); Cantón Espejo, Bosque Protector Mirador de Golondrinas, trail SW of La Cabaña del Corazón that passes the latrine, 00°49'N, 78°01'W, 2000 m, 9 Apr 1996, *J.L. Clark & R.W. Dunn 2446* (MO, QCNE, SRP, US); Cantón Espejo, Bosque Protector Mirador de Golondrinas, between the village of Las Juntas and La Cabaña del Corazón, 00°49'N, 78°01'W, 1400–2000 m, 10 Apr 1996, *J.L. Clark & R.W. Dunn 2466* (MO, QCNE, SRP, US); Cantón Tulcan, Parroquia Chical, path from the village of Quinyal towards an area known locally as "Gualpi" (near the border of the Reserva Awá), 00°57'54"N, 78°21'W, 1200–1700 m, 6 Dec 2001 (fr), *J.L. Clark & O. Mejia 6288* (MO, QCNE, US); Cantón Tulcan, Parroquia Chical, path from the village of Chical towards an area known locally as "Crystal" via Río Blanca and the Cordillera Gualchan (ca. 6–8 km SW of Chical), 00°53'49"N, 78°34'W, 1200–1800 m, 7 Dec 2001 (fl, fr), *J.L. Clark, O. Mejia & E. Diaz 6359* (CAS, E, F, K, MO, NY, QCA, QCNE, US); Cantón Espejo, Parroquia Guatal, Mirador de las Golondrinas (Fundación Golondrinas), trail from El Corazon towards La Cortadera (2 km NE of refugio), 00°49'46"N, 78°07'03"W, 2000–2500 m, 6 Jul 2003 (fr, fl), *J. L. Clark & E. Folleco 8462* (AAU, CAS, COL, E, F, K, MO, NY, QCNE, SEL, US, UNA); forest along trail from Rafael Quindi's house to his mountain finca, 00°52'N, 78°8'W, 1890 m, 28 Nov 1987 (fl), *W.S. Hoover & S. Wormley 1906* (MO); embankments along Río Verde, from point at which trail from Rafael's Mountain Finca crosses river, 1.5 km, 00°52'N, 78°8'W, 1890 m, 29 Nov 1987 (fl), *W.S. Hoover 1918* (MO); ridge to NE of Rafael Quind's mountain finca, 0°52'N, 78°8'W, 2000 m, 29 Nov 1987 (fl), *W.S. Hoover 2046* (MO); Gualpi Chico, Awá encampment, trail on reservation border going north, 00°58'N, 78°16'W, 1330 m, 15 Jan 1988 (fl), *W.S. Hoover, P. Gelpi, R.A. Lorentzen & A. Arguello 2463* (MO, US); near encampment in Gualpi Chico area of Awá Reserve, 00°58'N, 78°16'W, 1330 m, 20 Jan 1988 (fl), *W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen 2832* (MO, US); trail to Pailon on encampment, Gualpi Chico area of Awá, 00°58'N, 78°16'W, 1350–1400 m, 21 Jan 1988 (fl), *W.S. Hoover, A. Arguello, P. Gelpi & R.A. Lorentzen 3618* (MO, US); Cantón Tulcan, Parroquia Tobar Donoso, sector El Baboso, Reserva Indígena Awá, 00°53'N, 78°20'W, 1600 m, 3 Oct 1991 (fl), *G. Tipaz, D. Rubio & M. Taicuz 267* (SEL, US); Cantón Espejo, Parroquia Tobar Donoso, Reserva Indígena Awá, centro Baboso, 00°53'N, 78°25'W, 1800 m, 17–27 Aug 1992 (fl), *G. Tipaz, M. Tirado, C. Aulestia, N. Gale & P. Ortíz 1800* (US); Cantón Mira, El Carmen, Cerro Golondrinas, 00°50'N, 78°11'W, 2000–2400 m, 18–25 Aug 1994 (fl), *M. Tirado, P. Fuentes, R. Zurita & L. Chamorro 1286* (MO, QCNE, US); Espejo, Reserva Golondrinas, El Corazón, sendero a Río El Corazón, 00°50'N, 78°08'W, 2010 m, 24 Jan 2004 (fl), *H. Vargas et al. 4406* (MO, US); **Esmeraldas:** Cantón San Lorenzo, Parroquia Alto Tambo, mature forest 4–8 km W of El Cristal, 00°50'16"N 078°31'04"W, 1500–1650 m, 27 May 2008 (fr), *J.L. Clark, J. Melton III & O. Solarte 10310* (CAS, E, F, K, MO, NY, QCNE, SEL, UNA, US, W); Cantón San Lorenzo, Parroquia Alto Tambo, mature forest 4–8 km W of El Cristal, 00°50'16"N 078°31'04"W, 1500–1650 m, 27 May 2008 (fl), *J.L. Clark, J. Melton III & O. Solarte 10311* (QCNE, SEL, UNA, US); area of Cristal, above Lita, 1100–1150 m, 24 Apr 1995 (fl), *H. Wiehler et al. 9574* (SEL, US).

ACKNOWLEDGMENTS

Support for this project for the first author was provided by the Elvin McDonald Research Endowment Fund of The Gesneriad Society, the National Science Foundation (DEB 0206512), the Explorers Club Washington Group, and a Fulbright Graduate Study and Research Abroad Scholarship. We are grateful to Alice Tangerini for preparing illustrations of the new species and Harold Robinson for assisting with the Latin diagnosis. Herbaria MO, QCNE, and SEL are acknowledged for making their collections available to us. We also acknowledge Eric Roalson and Christian Feuillet for their careful reviews and comments on the manuscript.

REFERENCES

Dunn, R.W. 1997. A bright and shining star. Gesneriad J. 8(3–4):4–9.

McDowell, M. 1995. ¿Dondé Está Lita? Gloxinian 45(4):16–22.

Kvist, L.P. and L.E. Skog. 1992. Revision of *Kohleria* (Gesneriaceae). Smithsonian Contr. Bot. 79:1–83.

Roalson, E.H., J.K. Boggan, and L.E. Skog. 2005a. Reorganization of tribal and generic boundaries in the Gloxinieae (Gesneriaceae: Gesnerioideae) and the description of a new tribe in the Gesnerioideae, Sphaerorrhizeae. Selbyana 25:225–238.

Roalson, E.H., J.K. Boggan, L.E. Skog, and E.A. Zimmer. 2005b. Untangling Gloxinieae (Gesneriaceae). I. Phylogenetic patterns and generic boundaries inferred from nuclear, chloroplast, and morphological cladistic datasets. Taxon 54:389–410.